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(56) Documents cited
GB 2092472 A GB 1262121 A GB 1049292 A
EP 0202066 A2 US 3491519 A

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TNRT
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(54) **Dust receptacle**

(57) A dust receptacle for a vacuum cleaner comprises a rigid wall of sintered polymer, e.g. polyethylene, with an outer protective cage 40 and a removable end cover 46. The rigid wall 10 comprises a tubular section, made by bending and welding a flat sheet, closed at the lower end by a flat panel 32 of the same material. The end cover also incorporates a panel 44 of the sintered polymer. Wall 10 includes a dust inlet (11) in the side. The receptacle is housed inside a casing on the handle of an upright cleaner, and when full the receptacle is removed, emptied, washed and replaced. The casing has a fan at the lower end which induces flow of dust-laden air into the receptacle (Fig. 7).

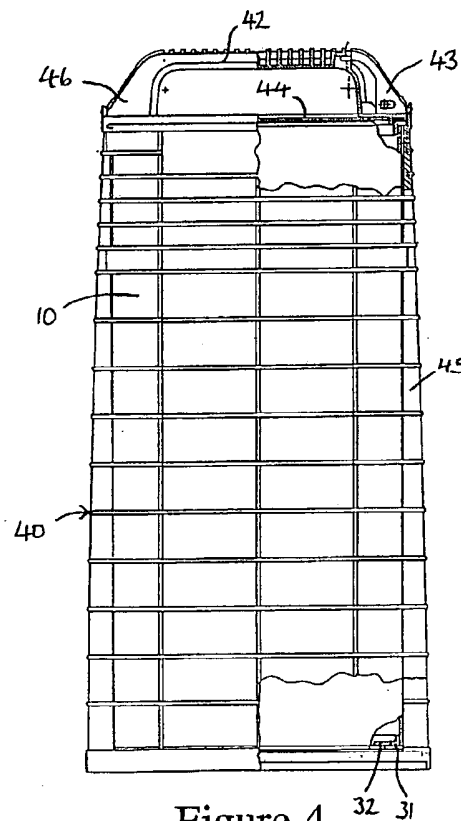


Figure 4

GB 2 265 096 A

1/4

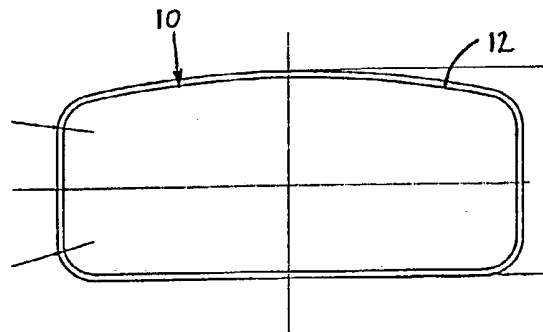


Figure 1

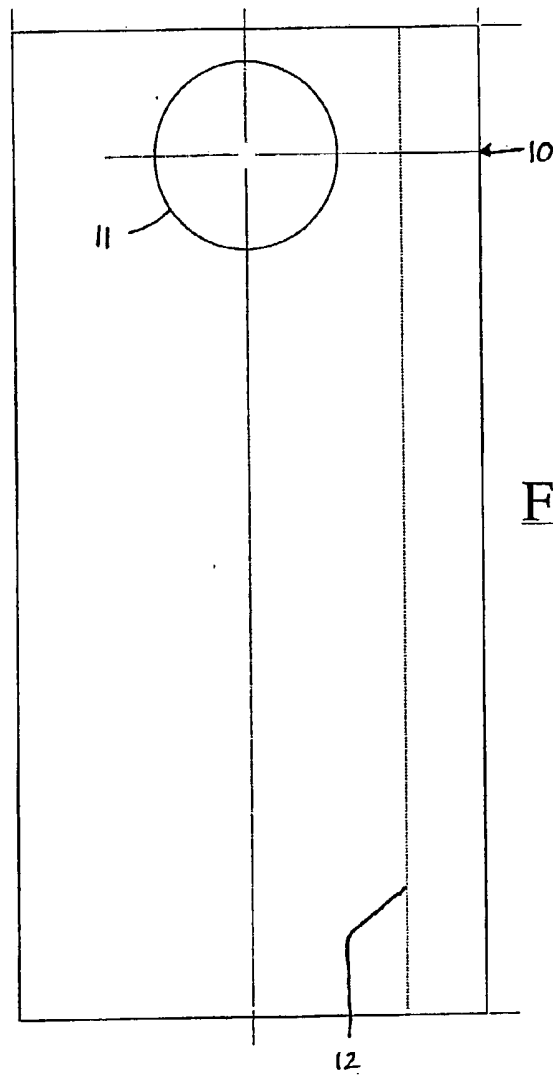


Figure 2

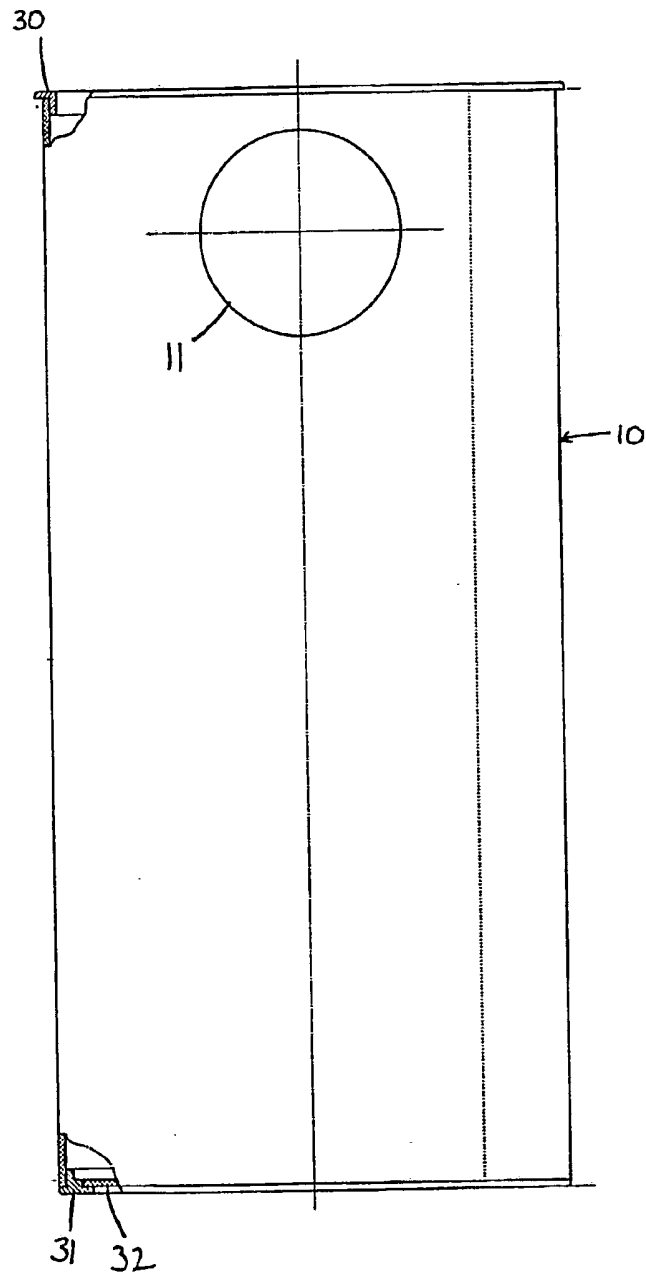


Figure 3

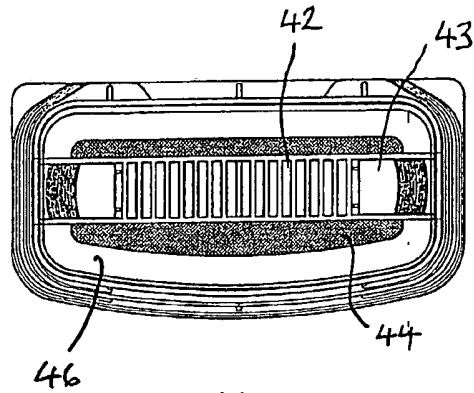


Figure 6

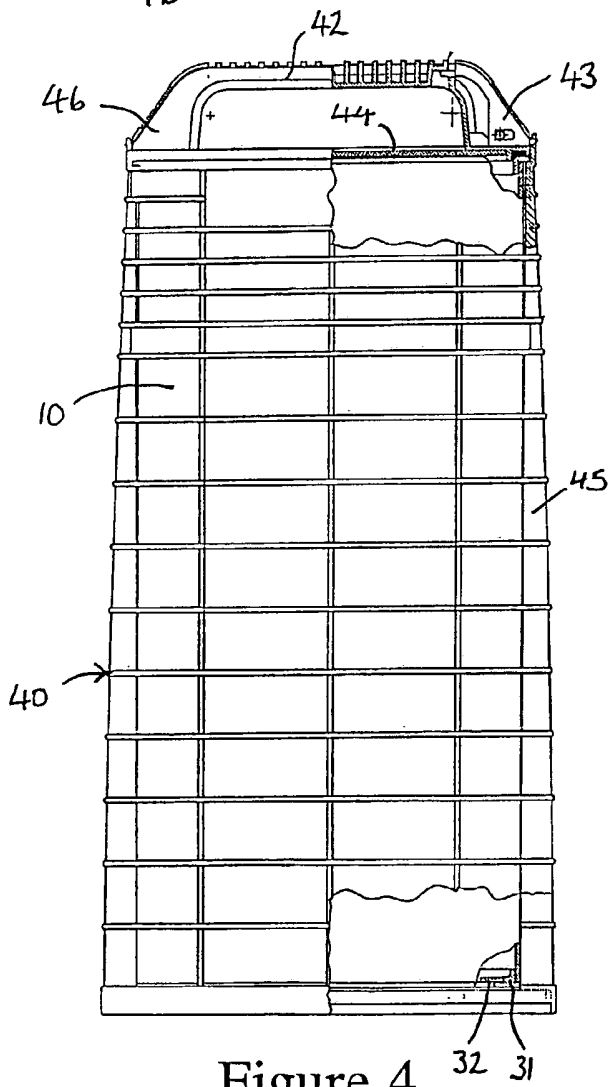


Figure 4

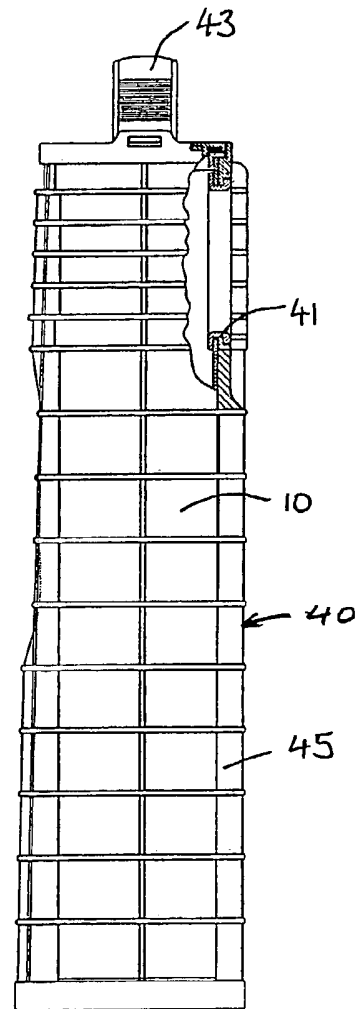


Figure 5

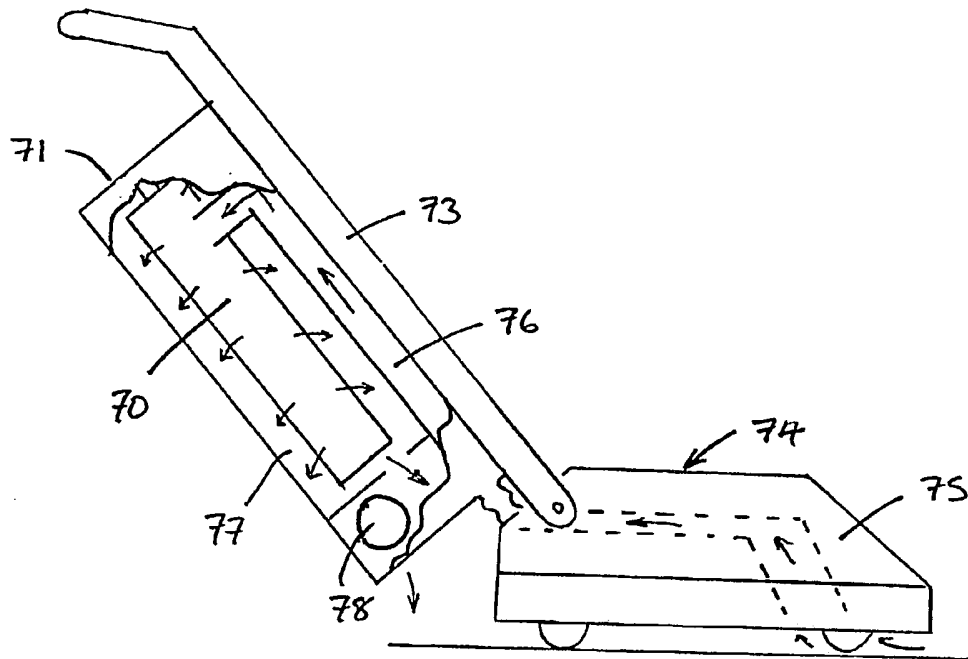


Figure 7

Dust receptacle

This invention relates to a dust receptacle and particularly but not solely to a dust receptacle for a vacuum cleaner.

Vacuum cleaners commonly have a filter or dust bag for
5 collecting the dirt and dust picked up by the vacuum cleaner.
Hitherto these bags have been made from paper, and when the bag
is full it has to be discarded and replaced by a new bag.
However, we have found that many users are reluctant to buy new
bags and instead they repeatedly re-use the same bags. By
10 doing this they reduce the efficiency and dust-retention
capability of the cleaner.

Bags made from filter fabric are also known, but these
bags become clogged with dirt and dust, and therefore have to
be cleaned. The only way of effectively cleaning fabric bags
15 is by washing, but the filtering ability of the fabric is
reduced each time the bag is washed.

Rigid and permanent dust receptacles are known which
can be emptied into a dustbin and re-used. One type of rigid
and permanent dust receptacle is disclosed in British patent
20 application No. 2 092 472. The receptacle comprises a box with
a hinged closure. Two sides of the box are formed from a
coarse mesh for filtering large particles of dirt. A secondary
pleated paper filter is disposed downstream of the coarse
filter. The dust collected in the receptacle may be emptied
25 directly into a dustbin by opening the closure. Although dust
receptacles of this kind eliminate the cost of buying
disposable bags, the secondary paper filter has to be replaced
if the efficiency of the cleaner is to be maintained. Also the
coarse filter has to be brushed or scraped periodically to
30 remove dirt which builds up on it. Furthermore, secondary
pleated paper filters are easily damaged when used in vacuum
cleaners which develop a high suction.

We have now devised a dust receptacle which alleviates
the above-mentioned problems which arise with known types of
35 vacuum cleaners.

In accordance with this invention, there is provided a
dust receptacle which comprises a rigid wall formed of
permeable plastics material.

Preferably the dust receptacle is in the form of an enclosure having an inlet aperture for dust-laden air. Preferably the enclosure includes a removable closure to enable the receptacle to be emptied.

5 The permeable plastics material (which may comprise a permeable polyethylene) may be in the form of a sheet. In this case preferably a piece of the sheet material is formed into a tube and its opposite edges are joined and its opposite ends closed to form the enclosure.

10 Preferably the dust receptacle comprises a filter element which includes said wall, and a cage into which the filter element is a close fit.

We have found that the permeable plastics material forms an effective dust filter, yet it can be washed, e.g. by
15 scrubbing or immersion in water, to restore its condition.

The dust receptacle is particularly useful in a vacuum cleaner, in that it can be removed from the cleaner and tipped to empty its contents and if desired washed, then replaced into the cleaner for re-use.

20 An embodiment of this invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a plan view of a filter element of a dust receptacle in accordance with the invention;

25 Figure 2 is a front view of the filter element of Figure 1;

Figure 3 is a front view of a filter body 3, with some parts shown in section;

30 Figure 4 is a front view of a dust receptacle which includes the filter body of Figure 3, with some parts shown in section;

Figure 5 is a side view of the dust receptacle of Figure 4;

35 Figure 6 is a plan view of the dust receptacle of Figure 4; and

Figure 7 is a side view of a vacuum cleaner when fitted with the dust receptacle of Figures 4 to 6.

Referring to Figures 1 and 2 of the drawings, there is shown a filter element 10 formed from a single sheet of rigid

plastics material. The material includes a multiplicity of pores in the nature of a foamed plastics, but may be manufactured by sintering rather than by foam techniques. The material typically has a permeability in the range of 15 to 20
 5 $\text{m}^3/\text{min}/\text{m}^2$ at 2.5 m bar pressure difference. For example, such a material is manufactured by Porvair Ltd under the trade name Vyond HS. The filter element 10 comprises a sheet of the material formed into a tube and having its opposite edges welded together along a line 12. The filter element 10 is also
 10 formed with a circular inlet aperture 11.

Referring to Figure 3, there is shown a filter body, comprising annular or ring-shaped plastics end frames 30, 31 ultrasonically welded to opposite ends of the filter element 10. A bottom panel 32 of the permeable sheet material fits in
 15 the lower end frame 32 to close that end of the filter body.

Referring to Figures 4 to 6, the filter body fits into and is retained inside a plastics cage 45. The cage 45 comprises intersecting horizontal and vertical spaced-apart ribs. The top of the cage 45 is open and a closure 46 having
 20 a handle 42 sealingly fits onto the open end. A portion 44 of the closure 46 is formed from the permeable sheet material, and the handle 42 is provided with a catch 43 for locking the closure 46 to the cage 40. A circular aperture is formed in the rear of the cage 40 in alignment with the aperture 11 in
 25 the filter element 10. An elastomeric ring 41 seals the filter element 10 to the cage 40.

In use, referring to Figure 7 the dust receptacle 70 is mounted inside an openable box 71 which is fixed to the handle 73 of an upright vacuum cleaner 74. The dust receptacle push-
 30 fits onto the neck of a fill tube 76. An electric motor 78 is mounted in the bottom of the box 71, and drives a fan which creates a vacuum inside the box 71. Air and dust are drawn from the carpet along a passageway through the body 75 of the cleaner. The passageway connects to the fill tube 76 which
 35 runs upwardly through the box 71. The dust is collected inside the receptacle 70 and clean, filtered air is drawn through the walls of the receptacle into a space 77 between the walls of the receptacle 70 and the box 71. The air is drawn through the fan and is expelled through an exhaust port in the wall of the

box 71.

When the receptacle 70 is full of dirt and dust it can be emptied by removing it from the vacuum cleaner, removing the closure 46 and shaking the receptacle over a dustbin. It will
5 be appreciated that the plastics cage protects the filter body from being damaged by persons beating the receptacle or striking it against the rim of the dustbin in order to dislodge its contents.

Occasionally the interior of the receptacle may be
10 brushed to remove any dirt or dust which has adhered to the inner surface of the filter body. The receptacle may also be washed with water from time to time, in particular when the receptacle becomes contaminated, for example with deposits such as those typically picked up from damp carpet at the entrance
15 to a building. Following washing, the receptacle must be dried thoroughly before being replaced into the cleaner.

CLAIMS

1. A dust receptacle comprising a rigid wall formed of permeable plastics material.
2. A dust receptacle as claimed in claim 1, which
5 comprises an enclosure having an inlet aperture for dust-laden air.
3. A dust receptacle as claimed in claim 2, in which the enclosure comprises a removable closure.
4. A dust receptacle as claimed in claim 2 or 3, in which
10 the permeable plastics material is in sheet form.
5. A dust receptacle as claimed in claim 4, in which a piece of said sheet material is formed into a tube with opposite edges joined and opposite ends of the tube are closed to form said enclosure.
- 15 6. A dust receptacle as claimed in any of claims 2 to 5, comprising a filter element which includes said wall, and a cage in which the filter element is a close fit.
7. A dust receptacle as claimed in any preceding claim, in which the permeable plastics material has a permeability to air
20 in the range of 15 to 20 m³/min/m² at a pressure difference of 2.5 m bar.
8. A dust receptacle substantially as herein described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields

(i) UK CI (Edition L) B1T (TBGA, TBHX, TDEA, TDPA, TNRT)

(ii) Int CI (Edition 5) A47L (9/10, 9/12, 9/14)

Search Examiner

R T HAINES

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search

7 APRIL 1993

Documents considered relevant following a search in respect of claims 1-8

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2092472 A (ATAKA)	1-4
X	GB 1262121 (SANYO ELECTRO CO)	1-4
X	GB 1049292 (TOKYO DENKI KK)	1-5
X	EP 0202066 A2 (NUMATIC INTERNATIONAL LTD) Note page 1, lines 15-26	1-4
X	US 3491519 (ETTRIDGE)	1-4

SF2(p)

HD - doc99\fil001691

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&c: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).